

Sea Change

Forum examines the health and future of the oceans

By Jennifer Cador

Are we killing the world's oceans? That's the troublesome question addressed by nine international experts along with delegates from around the globe at the Oceans Forum, sponsored by the University of Victoria and RSC: The Academies, Feb. 21 and 22. Vigorous debate and discussion revealed a healthy diversity of opinion, but one key message shone through: worldwide, the oceans are in crisis.

Fishing down the food chain

UBC's Dr. Daniel Pauly sounded the alarm in his keynote address, while simultaneously offering hope for the future in discussing whether societies have gone too far in mining fish from the sea. In his capacity as director of the Fisheries Centre at UBC, Pauly reassured an audience of close to 700 people at the Farquhar Auditorium that there is no "point of no return" for the oceans, but cautioned that the world has much fewer fish than it did before the onset of industrial fisheries. That drastic change means, among other things, that fishers are catching smaller and smaller fish, and species not previously sought, a phenomenon known as "fishing down the food web."

"In the past," Pauly explains, "there were lots of large, long-lived predators and small populations of small fish." In other words, large fish such as tuna are disappearing and we're left with smaller ones such as anchovies, although Pauly points out that anchovies and other smaller fish are just as edible as larger ones.

Government subsidies to depressed fishing industries are bad news too, Pauly says, because they encourage overfishing by paying fishers to continue plying their trade when stocks are depleted. Of course, telling fishers they can't fish can have serious social consequences too, as explained by Professor Renato Quiñones of the University of Concepción in Chile, who described the riots and protests that took place in that country when the jack mackerel fishery was closed.

Aquaculture, pro and con

Aquaculture isn't necessarily the answer either. Often a source of controversy, aquaculture, according to Pauly, breaks down into two types: good and bad. The good involves the raising of herbivorous fish. But the carnivorous fish we raise in BC, such as salmon, need fish meal. "The use of fish to feed other fish is not a solution to our fish supply problem."

Examined from another angle, though, aquaculture starts to sound

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more promising. Dr. Harald Rosenthal from the University of Kiel in Germany says it has potential as a system to feed the hungry and, in addition, fish can be cultured for biomedical research purposes. The potential exists as well for synergies with other ocean industries. For example, aquaculture could be combined with offshore wind farms to create energy.

The secret to success, says Rosenthal, is regulation. Growth must be managed. Rosenthal says the future for aquaculture is with rising powers like China, with North America and Europe playing smaller roles as drivers of quality and standards.

Offshore energy development

If aquaculture as a commercial enterprise hits a sore spot with the public, offshore oil and gas development provokes perhaps an even more intense reaction. Dr. Graham Shimmiel of the Scottish Association for Marine Sciences told a skeptical audience that ocean damage from oil and gas exploration in the North Sea has been minimal.

Shimmiel concedes there have been problems in the past, such as oil discharges, but says now these rarely exceed established limits of 40 mg/L. Where there have been spills, Shimmiel says disturbed areas are small—about 0.3 per cent of the spatial area of the Norwegian shelf—and environmental assessments are now required before drilling can take place.

Changes in ocean chemistry

One of the central stressors impacting our oceans today, however, is carbon dioxide—the same gas that is primarily responsible for global warming. UVic's Dr. Andrew Weaver, one of the authors of the UN Intergovernmental Panel on Climate Change (IPCC) report presented in Paris last month, is passionate and convincing when he says the amount of carbon in our atmosphere now dwarfs anything the Earth has seen in the last 650,000 years.

Weaver says we're on track to heat up 2.5 – 3° C by 2100, which coincidentally, is the critical threshold for the melting ice sheet that covers most of Greenland. Any warmer, warns Weaver, and the ice sheet is gone.

Stanford University's Dr. Ken Caldeira says high carbon emissions are essentially killing off coral reefs, although he shies away from predicting their extinction. High carbon levels in the atmosphere combine with water molecules, causing the oceans to become acidic and corrosive to corals. Corals need calcium carbonate to form their shells, but the acidification process takes away the necessary building blocks. Even more alarming, Caldeira says many species of plankton are threatened by ocean acidification because they, too, make calcium carbonate shells. Since they are the first link in the ocean food chain, their disappearance would have dire consequences for entire marine ecosystems.

Caldeira is clear on what needs to happen. "If we're really going to address both the climate and the ocean acidification problem, the goal needs to be to eliminate carbon dioxide emissions from our energy sector."

Weaver points out that meeting the Kyoto targets is not going to do it. "We're not talking about 6 per cent reductions. We're talking about 60–90 per cent reductions by 2050, sooner rather than later."

If carbon emissions are a problem, so is a lack of oxygen in the oceans. Hypoxic zones are areas of ocean that don't have enough oxygen to support much life, and Dr. Lisa Levin of the Scripps

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Institution of Oceanography says there has been a tremendous increase in the number of hypoxic zones in the last 50 years. Dead zones are even worse. These are areas where fish have either died or left. A big dead zone, covering over 2,600 sq km, has just opened up in the last five years off the coast of Oregon.

There is reason for optimism, though. "Hypoxia is actually controllable through nutrient regulation, and there's a lot of work in progress to try to cut down nutrients coming into our estuaries," Levin says.

What is to be done?

But if our oceans are in trouble, who's responsible? Dr. Barbara Neis of Memorial University of Newfoundland says we need to look at current philosophies underlying fisheries management.

"Our governments are increasingly giving fish stocks to corporations or fishermen who are in turn selling them off to corporations," Neis explains. "The goals and mandates of governments and business are different and non-transferable. Government is legitimately responsible for the stewardship of this country—its people and its resources. The business of business is profit."

In the end, we come back to the basic question: are we killing the world's oceans? Animated and occasionally emotional discussion concludes that our oceans are in trouble and to avoid future catastrophe, we need to act now—by demanding action from political leaders, by insisting on accountability, and, ultimately, by re-evaluating the impacts of our own lifestyles.